

## PATENT COOPERATION TREATY

## PCT

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY  
(Chapter II of the Patent Cooperation Treaty)

REC'D 01 SEP 2005

PCT

(PCT Article 36 and Rule 70)

|   |  |  |                       |
|---|--|--|-----------------------|
| Applicant's or agent's file reference<br>4905-A13   | <b>FOR FURTHER ACTION</b>  |  | See Form PCT/IPEA/416 |
| International application No.<br>PCT/US04/10679   | International filing date (day/month/year)<br>07 April 2004 (07.04.2004) | Priority date (day/month/year)<br>07 April 2003 (07.04.2003) |                       |
| International Patent Classification (IPC) or national classification and IPC<br>IPC(7): H01L 23/02 and US Cl.: 174/52.4 |  |  |                       |
| Applicant<br>PROTEK DEVICES, LP   |  |  |                       |

1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.

2. This REPORT consists of a total of 1 sheets, including this cover sheet.

3. This report is also accompanied by ANNEXES, comprising:

- (sent to the applicant and to the International Bureau) a total of \_\_\_ sheets, as follows:
  - sheets of the description, claims and/or drawings which have been amended and are the basis of this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).
  - sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.
- (sent to the International Bureau only) a total of (indicate type and number of electronic carrier(s)) \_\_\_ , containing a sequence listing and/or tables related thereto, in computer readable form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).

4. This report contains indications relating to the following items:

|                                     |              |   |
|-------------------------------------|--------------|---|
| <input checked="" type="checkbox"/> | Box No. I    | Basis of the report   |
| <input type="checkbox"/>            | Box No. II   | Priority  |
| <input type="checkbox"/>            | Box No. III  | Non-establishment of opinion with regard to novelty, inventive step and industrial applicability  |
| <input type="checkbox"/>            | Box No. IV   | Lack of unity of invention  |
| <input checked="" type="checkbox"/> | Box No. V    | Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement |
| <input type="checkbox"/>            | Box No. VI   | Certain documents cited   |
| <input type="checkbox"/>            | Box No. VII  | Certain defects in the international application  |
| <input type="checkbox"/>            | Box No. VIII | Certain observations on the international application   |

|  |   |
|--|---|
| Date of submission of the demand<br>03 November 2004 (03.11.2004)  | Date of completion of this report<br>11 July 2005 (11.07.2005)  |
| Name and mailing address of the IPEA/ US<br>Mail Stop PCT, Attn: IPEA/US<br>Commissioner for Patents<br>P.O. Box 1450<br>Alexandria, Virginia 22313-1450<br>Facsimile No. (703) 305-3230 | Authorized officer<br>Hung V. Ngo<br><br>Telephone No. (571) 272-1979 |

## INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.

PCT/US04/10679

## Box No. I Basis of the report

1. With regard to the language, this report is based on the international application in the language in which it was filed, unless otherwise indicated under this item.

This report is based on translations from the original language into the following language \_\_\_\_\_, which is the language of a translation furnished for the purposes of:

- international search (under Rules 12.3 and 23.1(b))
- publication of the international application (under Rule 12.4)
- international preliminary examination (under Rules 55.2 and/or 55.3)

2. With regard to the elements of the international application, this report is based on (replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report):

the international application as originally filed/furnished  
 the description:

pages 1-12 as originally filed/furnished  
 pages\* NONE received by this Authority on \_\_\_\_\_  
 pages\* NONE received by this Authority on \_\_\_\_\_

the claims:  
 pages 13-15 as originally filed/furnished  
 pages\* NONE as amended (together with any statement) under Article 19  
 pages\* NONE received by this Authority on \_\_\_\_\_  
 pages\* NONE received by this Authority on \_\_\_\_\_

the drawings:  
 pages 1-3 as originally filed/furnished  
 pages\* NONE received by this Authority on \_\_\_\_\_  
 pages\* NONE received by this Authority on \_\_\_\_\_

a sequence listing and/or any related table(s) - see Supplemental Box Relating to Sequence Listing.

3.  The amendments have resulted in the cancellation of:

- the description, pages \_\_\_\_\_
- the claims, Nos. \_\_\_\_\_
- the drawings, sheets/figs \_\_\_\_\_
- the sequence listing (specify): \_\_\_\_\_
- any table(s) related to the sequence listing (specify): \_\_\_\_\_

4.  This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).

- the description, pages \_\_\_\_\_
- the claims, Nos. \_\_\_\_\_
- the drawings, sheets/figs \_\_\_\_\_
- the sequence listing (specify): \_\_\_\_\_
- any table(s) related to the sequence listing (specify): \_\_\_\_\_

\* If item 4 applies, some or all of those sheets may be marked "superseded."

**INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY**International application No.  
PCT/US04/10679**Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement****1. Statement****Novelty (N)**Claims 1-9 YES  
Claims NONE NO**Inventive Step (IS)**Claims 1-9 YES  
Claims NONE NO**Industrial Applicability (IA)**Claims 1-9 YES  
Claims NONE NO**2. Citations and Explanations (Rule 70.7)**

Claims 1-9 meet the criteria set out in PCT Article 33(2)-(3), because the prior art does not teach or fairly suggest a solder contact bump.

Claims 1-9 meet the criteria set out in PCT Article 33(4), and thus claims 1-9 meet industrial applicability because the subject matter claimed can be made or used in electronic industry.

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----- NEW CITATIONS -----

**INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY**

International application No.  
PCT/US04/10679

**Supplemental Box**

In case the space in any of the preceding boxes is not sufficient.

Continuation of:

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property  
Organization  
International Bureau



(43) International Publication Date  
28 October 2004 (28.10.2004)

PCT

(10) International Publication Number  
**WO 2004/093135 A3**

(51) International Patent Classification<sup>7</sup>: H01L 21/44,  
23/495

CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI,  
GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE,  
KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD,  
MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG,  
PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM,  
TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM,  
ZW.

(21) International Application Number:  
PCT/US2004/010679

(22) International Filing Date: 7 April 2004 (07.04.2004)

(25) Filing Language: English

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60/461,122 7 April 2003 (07.04.2003) US

(71) Applicant (for all designated States except US): PROTEK DEVICES, LP [US/US]; 2929 South Fair Lane, Tempe, AZ 85282 (US).

Declaration under Rule 4.17:

— of inventorship (Rule 4.17(iv)) for US only

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Published:

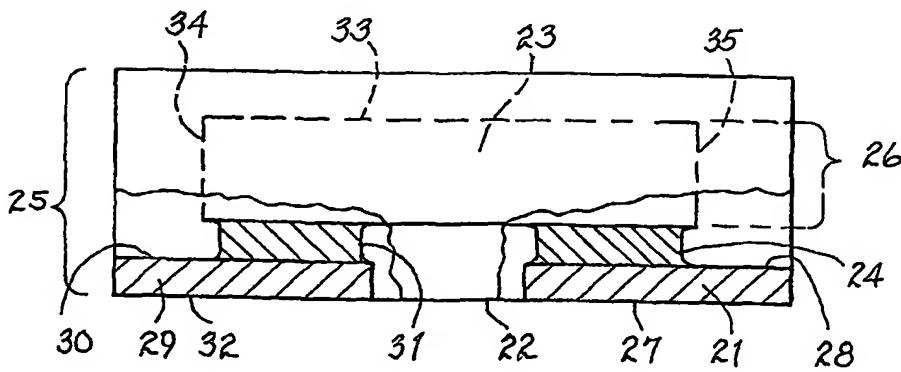
— with international search report  
— before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments

(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN,

(88) Date of publication of the international search report:  
31 March 2005

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: LOW PROFILE SMALL OUTLINE LEADLESS SEMICONDUCTOR DEVICE PACKAGE



(57) Abstract: A molded leadless package (25) encapsulates a small outline integrated circuit or small outline transistor (23) through contact bumps (24). Electrical contacts (21, 29) extend from the encapsulated device (23) to an exposed surface (22) of the package and are coplanar with that surface (22) and terminate at a junction between said surface (22) at a junction with another of the package surfaces. The contacts (21, 29) terminate only at oppositely disposed surfaces of the package (25).

WO 2004/093135 A3

# INTERNATIONAL SEARCH REPORT

International application No.

PCT/US04/10679

## A. CLASSIFICATION OF SUBJECT MATTER

IPC(7) : H01L 21/44, 23/495  
 US CL : 174/52.2; 257/666, 690; 438/123

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)  
 U.S. : 174/52.2, 52.3, 52.4; 257/666, 678, 684, 687, 690, 692; 438/123, 124

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

| Category * | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
|------------|--|-----------------------|
| X          | US 6,400,004 (FAN et al.) 4 June 2002 (04.06.2002), entire document.               | 1-9                   |
| A          | US 6,153,928 (CHO) 28 November 2000 (28.11.2000), Fig. 5                           | 1-9                   |
| A          | US 6,433,277 (GLENN) 13 August 2002 (13.08.2002), Fig. 8                           | 1-9                   |
| A,T        | US 6,723,585 (TU et al.) 20 April 2004 (20.04.2004), Fig. 3                        | 1-9                   |

Further documents are listed in the continuation of Box C.

See patent family annex.

### \* Special categories of cited documents:

- "A" document defining the general state of the art which is not considered to be of particular relevance
- "E" earlier application or patent published on or after the international filing date
- "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- "O" document referring to an oral disclosure, use, exhibition or other means
- "P" document published prior to the international filing date but later than the priority date claimed

"T"

later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X"

document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y"

document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&"

document member of the same patent family

Date of the actual completion of the international search

15 November 2004 (15.11.2004)

Date of mailing of the international search report

11 FEB 2005

Name and mailing address of the ISA/US

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